

Climate Science Meets a Stubborn Obstacle: Students

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Highlight: A new teacher's efforts to educate teenagers in Ohio coal country ran up against a cultural resistance to evidence of the human role in global warming.

Body

WELLSTON, Ohio — To Gwen Beatty, a junior at the high school in this proud, struggling, Trump-supporting town, the new science teacher's lessons on climate change seemed explicitly designed to provoke her.

So she provoked him back.

When the teacher, James Sutter, ascribed the recent warming of the Earth to heat-trapping gases released by burning fossil fuels like the coal her father had once mined, she asserted that it could be a result of other, natural causes.

When he described the flooding, droughts and fierce storms that scientists predict within the century if such carbon emissions are not sharply reduced, she challenged him to prove it. "Scientists are wrong all the time," she said with a shrug, echoing those celebrating President Trump's announcement last week that the United States would withdraw from the Paris climate accord.

When Mr. Sutter lamented that information about climate change had been removed from the White House website after Mr. Trump's inauguration, she rolled her eyes.

"It's his website," she said.

For his part, Mr. Sutter occasionally fell short of his goal of providing Gwen — the most vocal of a raft of student climate skeptics — with calm, evidence-based responses. "Why would I lie to you?" he demanded one morning. "It's not like I'm making a lot of money here."

She was, he knew, a straight-A student. She would have had no trouble comprehending the evidence, embedded in ancient tree rings, ice, leaves and shells, as well as sophisticated computer models, that atmospheric carbon dioxide is the chief culprit when it comes to warming the world. Or the graph he showed of how sharply it has spiked since the Industrial Revolution, when humans began pumping vast quantities of it into the air.

Thinking it a useful soothing device, Mr. Sutter assented to Gwen's request that she be allowed to sand the bark off the sections of wood he used to illustrate tree rings during class. When she did so with an energy that, classmates said, increased during discussion points with which she disagreed, he let it go.

When she insisted that teachers "are supposed to be open to opinions," however, Mr. Sutter held his ground.

"It's not about opinions," he told her. "It's about the evidence."

"It's like you can't disagree with a scientist or you're 'denying science,'" she sniffed to her friends.

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Gwen, 17, could not put her finger on why she found Mr. Sutter, whose biology class she had enjoyed, suddenly so insufferable. Mr. Sutter, sensing that his facts and figures were not helping, was at a loss. And the day she grew so agitated by a documentary he was showing that she bolted out of the school left them both shaken.

"I have a runner," Mr. Sutter called down to the office, switching off the video.

He had chosen the video, an episode from an Emmy-winning series that featured a Christian climate activist and high production values, as a counterpoint to another of Gwen's objections, that a belief in climate change does not jibe with Christianity.

"It was just so biased toward saying climate change is real," she said later, trying to explain her flight. "And that all these people that I pretty much am like are wrong and stupid."

Classroom Culture Wars

As more of the nation's teachers seek to integrate climate science into the curriculum, many of them are reckoning with students for whom suspicion of the subject is deeply rooted.

In rural Wellston, a former coal and manufacturing town seeking its next act, rejecting the key findings of climate science can seem like a matter of loyalty to a way of life already under siege. Originally tied, perhaps, to economic self-interest, climate skepticism has itself become a proxy for conservative ideals of hard work, small government and what people here call "self-sustainability."

Assiduously promoted by fossil fuel interests, that powerful link to a collective worldview largely explains why just 22 percent of Mr. Trump's supporters in a 2016 poll said they believed that human activity is warming the planet, compared with half of all registered voters. And the prevailing outlook among his base may in turn have facilitated the president's move to withdraw from the global agreement to battle rising temperatures.

"What people 'believe' about global warming doesn't reflect what they know," Dan Kahan, a Yale researcher who studies political polarization, has stressed in talks, papers and blog posts. "It expresses who they are."

But public-school science classrooms are also proving to be a rare place where views on climate change may shift, research has found. There, in contrast with much of adult life, it can be hard to entirely tune out new information.

"Adolescents are still heavily influenced by their parents, but they're also figuring themselves out," said Kathryn Stevenson, a researcher at North Carolina State University who studies climate literacy.

Gwen's father died when she was young, and her mother and uncle, both Trump supporters, doubt climate change as much as she does.

"If she was in math class and teacher told her two plus two equals four and she argued with him about that, I would say she's wrong," said her uncle, Mark Beatty. "But no one knows if she's wrong."

As Gwen clashed with her teacher over the notion of human-caused climate change, one of her best friends, Jacynda Patton, was still circling the taboo subject. "I learned some stuff, that's all," Jacynda told Gwen, on whom she often relied to supply the \$2.40 for school lunch that she could not otherwise afford.

Hired a year earlier, Mr. Sutter was the first science teacher at Wellston to emphasize climate science. He happened to do so at a time when the mounting evidence of the toll that global warming is likely to take, and the Trump administration's considerable efforts to discredit those findings, are drawing new attention to the classroom from both sides of the nation's culture war.

Since March, the Heartland Institute, a think tank that rejects the scientific consensus on climate change, has sent tens of thousands of science teachers a book of misinformation titled "Why Scientists Disagree About Global Warming," in an effort to influence "the next generation of thought," said Joseph Bast, the group's chief executive.

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The Alliance for Climate Education, which runs assemblies based on the consensus science for high schools across the country, received new funding from a donor who sees teenagers as the best means of reaching and influencing their parents.

Idaho, however, this year joined several other states that have declined to adopt new science standards that emphasize the role human activities play in climate change.

At Wellston, where most students live below the poverty line and the needle-strewn bike path that abuts the marching band's practice field is known as "heroin highway," climate change is not regarded as the most pressing issue. And since most Wellston graduates typically do not go on to obtain a four-year college degree, this may be the only chance many of them have to study the impact of global warming.

But Mr. Sutter's classroom shows how curriculum can sometimes influence culture on a subject that stands to have a more profound impact on today's high schoolers than their parents.

"I thought it would be an easy A," said Jacynda, 16, an outspoken Trump supporter. "It wasn't."

God's Gift to Wellston?

Mr. Sutter, who grew up three hours north of Wellston in the largely Democratic city of Akron, applied for the job at Wellston High straight from a program to recruit science professionals into teaching, a kind of science-focused Teach for America.

He already had a graduate-level certificate in environmental science from the University of Akron and a private sector job assessing environmental risk for corporations. But a series of personal crises that included his sister's suicide, he said, had compelled him to look for a way to channel his knowledge to more meaningful use.

The fellowship gave him a degree in science education in exchange for a three-year commitment to teach in a high-needs Ohio school district. Megan Sowers, the principal, had been looking for someone qualified to teach an Advanced Placement course, which could help improve her financially challenged school's poor performance ranking. She hired him on the spot.

But at a school where most teachers were raised in the same southeastern corner of Appalachian Ohio as their students, Mr. Sutter's credentials themselves could raise hackles.

"He says, 'I left a higher-paying job to come teach in an area like this,'" Jacynda recalled. "We're like, 'What is that supposed to mean?'"

"He acts," Gwen said with her patented eye roll, "like he's God's gift to Wellston."

In truth, he was largely winging it.

Some 20 states, including a handful of red ones, have recently begun requiring students to learn that human activity is a major cause of climate change, but few, if any, have provided a road map for how to teach it, and most science teachers, according to one recent survey, spend at most two hours on the subject.

Chagrined to learn that none of his students could recall a school visit by a scientist, Mr. Sutter hosted several graduate students from nearby Ohio University.

On a field trip to a biology laboratory there, many of his students took their first ride on an escalator. To illustrate why some scientists in the 1970s believed the world was cooling rather than warming ("So why should we believe them now?" students sometimes asked), he brought in a 1968 push-button phone and a 1980s Nintendo game cartridge.

"Our data and our ability to process it is just so much better now," he said.

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In the A.P. class, Mr. Sutter took an informal poll midway through: In all, 14 of 17 students said their parents thought he was, at best, wasting their time. “My stepdad says they’re brainwashing me,” one said.

Jacynda’s father, for one, did not raise an eyebrow when his daughter stopped attending Mr. Sutter’s class for a period in the early winter. A former coal miner who had endured two years of unemployment before taking a construction job, he declined a request to talk about it.

“I think it’s that it’s taken a lot from him,” Jacynda said. “He sees it as the environmental people have taken his job.”

And having listened to Mr. Sutter reiterate the overwhelming agreement among scientists regarding humanity’s role in global warming in answer to another classmate’s questions — “What if we’re not the cause of it? What if this is something that’s natural?” — Jacynda texted the classmate one night using an expletive to refer to Mr. Sutter’s teaching approach.

But even the staunchest climate-change skeptics could not ignore the dearth of snow days last winter, the cap to a year that turned out to be the warmest Earth has experienced since 1880, according to NASA. The high mark eclipsed the record set just the year before, which had eclipsed the year before that.

In woods behind the school, where Mr. Sutter had his students scout out a nature trail, he showed them the preponderance of emerald ash borers, an invasive insect that, because of the warm weather, had not experienced the usual die-off that winter. There was flooding, too: Once, more than 5.5 inches of rain fell in 48 hours.

The field trip to a local stream where the water runs neon orange also made an impression. Mr. Sutter had the class collect water samples: The pH levels were as acidic as “the white vinegar you buy at a grocery store,” he told them. And the drainage, they could see, was from the mine.

It was the realization that she had failed to grasp the damage done to her immediate environment, Jacynda said, that made her begin to pay more attention. She did some reading. She also began thinking that she might enjoy a job working for the Environmental Protection Agency — until she learned that, under Mr. Trump, the agency would undergo huge layoffs.

“O.K., I’m not going to lie. I did a 180,” she said that afternoon in the library with Gwen, casting a guilty look at her friend. “This is happening, and we have to fix it.”

After fleeing Mr. Sutter’s classroom that day, Gwen never returned, a pragmatic decision about which he has regrets. “That’s one student I feel I failed a little bit,” he said.

As an alternative, Gwen took an online class for environmental science credit, which she does not recall ever mentioning climate change. She and Jacynda had other things to talk about, like planning a bonfire after prom.

As they tried on dresses last month, Jacynda mentioned that others in their circle, including the boys they had invited to prom, believed the world was dangerously warming, and that humans were to blame. By the last days of school, most of Mr. Sutter’s doubters, in fact, had come to that conclusion.

“I know,” Gwen said, pausing for a moment. “Now help me zip this up.”

PHOTOS: James Sutter teaches environmental science to high school students in Ohio. (A1); Gwen Beatty in James Sutter’s classroom at Wellston High School in Ohio, where she and Mr. Sutter butted heads over the issue of human-caused climate change.; In Wellston, a former coal town, rejecting a key finding of climate science can seem like loyalty to a way of life under siege.; Mr. Sutter, left, walking with his students on a nature trail next to the high school. Students in his Advanced Placement environmental science class included Jacynda Patton, right, one of Gwen Beatty’s best friends. Mr. Sutter’s evidence on climate change persuaded Jacynda. Gwen said she remained unconvinced. “That’s one student I feel I failed a little bit,” Mr. Sutter said. (PHOTOGRAPHS BY MADDIE MCGARVEY FOR THE NEW YORK TIMES) (A14)

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